INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 2000	**Park:** Shenandoah NP
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Permit#:
SHEN2000N-253

Park-assigned Study Id. #:
unknown

Project Title:
Hydrologic And Geochemical Controls On Episodic Acidification Of Streams In Shenandoah National Park, Virginia: Development And Testing Of A Predictive Model

Permit Start Date: Feb 28, 2000	**Permit Expiration Date** Mar 15, 2001
Study Start Date: Jan 01, 1999	**Study End Date** Sep 30, 2001

Study Status:
Continuing

Activity Type:
Research

Subject/Discipline:
Water Resources

Objectives:
This project examines the connection between rock-water interaction. Through coupled modeling of water and solute transport with geochemical reactions, a framework for quantifying the space-time continuum of geochemical processes occurring within selected SNP catchments will be developed. The hypothesis is that a continuum representation is crucial to a greater understanding of the dynamics of the relationship between flow path evolution, acid-buffering processes, and stream chemistry. Specific objectives are to: 1) develop a theoretical framework for quantifying transient, topographically controlled water movement and reactive mass transport in the subsurface; 2) calibrate and test this framework at 3 catchments at time scales ranging from episodic to annual; and 3) examine model sensitivity to both hydrological and geochemical parameters, to determine controls on stream chemistry.

Findings and Status:
Soil-water samples were collected in January, April, and July and analyzed. A USGS Open-File Report of the soil-water-quality data is in preparation. Stormflow acid-neutralizing capacity data for Paine Run, Staunton River, and Piney River were analyzed in detail, with attention paid to concentration-discharge plots. In general, Paine Run experiences more counterclockwise rotation patterns than Staunton River or Piney River, suggesting that acidic precipitation input is more quickly routed to the stream. These findings are in agreement with our previous modeling results. In addition, we used discriminant analysis to identify the most important environmental variables for predicting the rotation pattern in each catchment. An abstract describing these findings was presented at the American Geophysical Union Spring meeting in Washington, D.C., in June. In addition, these results were presented in a NPS/USGS cyber conference in November. Two manuscripts for the peer-reviewed literature are in preparation.

For this study, were one or more specimens collected and removed from the park but not destroyed during analyses?
No

Funding provided this reporting year by NPS:	Funding provided this reporting year by other sources:
101190	0
Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college	
Full name of college or university:	**Annual funding provided by NPS to university or college this reporting year:**
University of Virginia	24033